

Failure Modes and Effects Analysis/Critical Items List

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 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Relief Valve Qty: 1 FMEA Number: US-SFR-110
 Item Part Number: 5159T-6T-L-300 ORU Name: SAFER
 Subsystem Name: Propulsion ORU Part Number: SED33105900-311
 Function: Protects low-pressure system against failed open/leaking regulator.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33105904
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS: 1R Shuttle: 1R/3
 Success Paths: Success Paths Remaining: None

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: Relief valve fails open.
 Failure Mode Code:
 Failure Cause: Contamination, leakage from relief seat, binding of relief poppet, piece-part failure.
 Failure Detection:
 Flight: IVA – None.
 EVA – Thrust response will degrade. LCD will display pressure drop with a flashing tank pressure message.
 The message “Excessive Leak” will be displayed.
 Ground: Functional Test.
 Time To Detect Quantity: 10 Time To Detect Units: Seconds
 Correcting Action: IVA – None.
 EVA – None.
 Remarks: 1. Stabilization of SAFER (AAH) and maneuver capability may be available, depending on rate of GN₂ loss.
 2. If the percent of GN₂ remaining drops below 15%, a flashing GN₂% message and flashing down arrow will be displayed on the HCM.
 3. If tank pressure drops below 524 psia, a flashing tank pressure message and flashing down arrow will be displayed on the HCM.
 Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:
First/Second Failure: Inadvertent EVA crewmember separation.
Third (this) Failure: Failed open relief valve allows loss of/reduced GN₂ flow to thrusters. Unable to perform self-rescue.
 On Subsystem/Next Assembly: None.
 On End Item/Segment: Prevents self rescue.
 On Crew/ISS: Possible loss of EVA crewmember.
 Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS	(Shuttle)		
Checkout Pre-Launch	(A):	Pass	
Checkout On-Orbit	(B):	Pass	
Detection Flight Crew:		Pass	Or Detection Ground Crew: Fail
Loss Of Redundancy From A Single Cause	(C):	N/A	